

SECTION 201 CLEARING AND GRUBBING:

201-1 Description:

The work under this section shall consist of removing and disposing of all vegetation, rubbish, debris and other objectionable matter from within the highway right-of-way, bridge construction areas, road approaches, areas through which ditches and channels are to be excavated, and such other areas as may be specified in the Special Provisions. Clearing and grubbing shall be performed in advance of grading operations and in accordance with the requirements of these specifications.

All vegetation and objects designated to remain shall be preserved from injury or defacement. Property and landscape shall be protected and restored in accordance with the requirements of Subsection 107.11.

201-2 Blank

201-3 Construction Requirements:

201-3.01 Clearing and Grubbing:

The entire length of the project, to the widths specified below, shall be cleared and grubbed, unless otherwise shown on the project plans or specified in the Special Provisions.

The area above the natural ground surface shall be cleared of all vegetation, such as trees, logs, upturned stumps, roots, brush, grass, weeds, and all other objectionable material within the following limits:

Highway construction areas, including structures, frontage roads, streets, ramps, - road approaches, ditches and channels, and all access roads and connections that are to be constructed. Such areas shall extend to a width of five feet outside of structures and excavation and embankment slope lines.

Areas enclosed by interchange loops and ramps.

Within the limits of clearing, the areas below the natural ground surface, except in embankment areas where the finished subgrade elevation is five feet or more above the natural ground, shall be grubbed to a depth necessary to remove all stumps, roots, buried logs and other objectionable material.

In embankment areas, where the subgrade is five or more feet above the natural ground line, all trees, stumps and roots shall be cut off not more than one foot above the natural ground or shall be completely removed where a structure is to be constructed, piles are to be placed or driven, or where unsuitable material is to be removed.

Cavities resulting from the removal of stumps or other materials, except in areas to be excavated, shall be backfilled with material approved by the Engineer. The material shall be compacted to a density of not less than 95 percent of the maximum density as

determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer.

Scarred surfaces, resulting from the work, on trees and shrubs that are to remain, shall be treated with an approved asphaltum base tree paint.

Unless specified otherwise in the Special Provisions, merchantable timber and other vegetation not designated to remain shall become the property of the contractor.

In national forest areas, clearing and grubbing shall also conform to the applicable rules and regulations of the United States Forest Service in accordance with the requirements of Subsection 107.12.

201-3.02 Removal and Disposal of Materials:

All materials removed in clearing and grubbing shall be disposed of at locations outside of the right-of-way which are not visible from the roadway and in accordance with the requirements of Subsection 107.11.

In the disposal of all tree trunks, stumps, brush, limbs, roots, vegetation and other debris, the contractor shall comply with the requirements of Title 36, Public Health and Safety, Chapter 6, Article 8, Air Pollution, of the Arizona Revised Statutes and with the Rules and Regulations for Air Pollution Control, Article 7, adopted by the Arizona Department of Health Services pursuant to the authority granted by the Statutes.

Burning will be permitted only after the contractor has obtained a permit from the Arizona Department of Health Services and from any other Federal, State, County or City Agency that may be involved.

Combustible material may be reduced to chips of a maximum thickness of 1/2 inch and disposed of in areas between the slope lines and right-of-way lines as approved by the Engineer. The chips may either be buried or distributed uniformly on the ground surface and mixed with the underlying earth to such extent that the chips will not support combustion.

The roadway and adjacent areas shall be left with a neat and finished appearance. No accumulation of material shall remain on or adjacent to the right-of-way.

201-4 Method of Measurement:

Clearing and grubbing will be measured either on a lump sum basis or by the acre. Measurement by the acre will be to the nearest tenth of an acre, measured on a horizontal plane.

201-5 Basis of Payment:

The accepted quantities of clearing and grubbing, measured as provided above, will be paid for at the contract lump sum price or by the acre as designated in the bidding schedule,

including furnishing, placing and compacting the material required to fill the cavities resulting from the removal of tree stumps or other materials.

No payment will be made for clearing and grubbing outside the specified limits, unless such work is authorized by the Engineer.

When clearing and grubbing is not included as a contract pay item, full compensation for any clearing and grubbing necessary to perform the construction operations designated on the project plans or specified in the Special Provisions shall be considered as included in the price of contract items.

SECTION 202 REMOVAL OF STRUCTURES AND OBSTRUCTION:

202-1 Description:

The work under this section shall consist of the removal, wholly or in part, and satisfactory disposal of all structures and obstructions within the right-of-way which have not been designated on the project plans or specified in the Special Provisions to remain, except for those structures and obstructions which are to be removed and disposed of under other items of work in the contract. The work shall also include salvaging of designated materials and backfilling the resulting cavities.

Existing structures, pavement, sidewalks, curbs, gutters and other existing improvements which are to become an integral part of the planned improvements shall remain even though not specifically noted.

Materials removed and not designated to be salvaged or incorporated into the work shall become the property of the contractor.

202-2 Blank

202-3 Construction Requirements:

202-3.01 General:

Bridges, culverts and other structures in use by traffic shall not be removed until satisfactory arrangements have been made to accommodate the traffic.

Blasting or other operations necessary for the removal of an existing structure or obstruction, which may damage new construction, shall be completed prior to commencing the new work.

Items designated to be salvaged shall be carefully stockpiled or stored by the contractor at locations designated in the Special Provisions or as directed by the Engineer.

Items which are to be salvaged or reused in the new construction and are damaged or destroyed as a result of the contractor's operations shall be repaired or replaced by the contractor at no additional cost to the Department.

Holes, cavities, trenches and depressions resulting from the removal of structures or obstructions, except in areas to be excavated, shall be backfilled with suitable material which shall be compacted to a density of not less than 95 percent of the maximum density as determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer.

202-3.02 Removal of Pipe:

All removed pipe which is to be salvaged or relaid shall be cleaned of all earth and other material inside and outside prior to being stockpiled or reused. Pipe to be reused shall be stored when necessary to avoid damage or loss before relaying.

Existing pipe to be partially removed shall be cut with straight and smooth edges on a plane perpendicular to the center line of the pipe.

202-3.03 Removal of Pavement:

(A) Portland Cement Concrete Pavement:

Unless otherwise specified in the Special Provisions, concrete pavement designated on the project plans to be removed shall either be removed from the job site and disposed of at a site secured by the contractor or buried in embankment areas. If the contractor elects to bury the concrete in embankment areas, the concrete shall be broken into pieces and placed in the embankment in accordance with the requirements of Subsection 203-10.03(A).

Where new construction is to join the existing concrete pavement, the pavement shall be saw cut to a true line perpendicular to the centerline of the pavement with straight vertical edges free from irregularities.

(B) Bituminous Pavement:

Unless milling is specified in the Special Provisions, all bituminous pavement designated on the project plans to be removed, shall be completely removed down to the underlying base course or subgrade. The pavement material shall be removed and disposed of as specified in the Special Provisions.

Where new construction is to join existing bituminous pavement, the existing pavement shall be cut to a true line perpendicular to the centerline of the pavement with straight vertical edges free from irregularities. The removal of asphaltic concrete at the approaches to structures shall be accomplished in a manner approved by the Engineer.

(C) Bituminous Pavement Removal By Milling:

When milling is specified, the existing asphaltic concrete shall be removed in accordance with the details shown on the project plans with equipment specifically designed to remove such material by means of grinding or chipping to a controlled line and grade. The

equipment used shall be capable of removing the existing asphaltic concrete within 0.01 feet of the specified removal depth. The removal shall be accomplished in a manner which does not destroy the integrity of any asphaltic concrete pavement that remains and which does not result in a contamination of the milled asphaltic concrete with the underlying base material. The milled material shall be removed and disposed of as specified in the Special Provisions.

Under no circumstance shall the removal of existing asphaltic concrete begin until the mix design for replacement asphaltic concrete has been approved by the Engineer.

The extent of removal of existing asphaltic concrete must be in keeping with the contractor's ability to produce, haul, place and compact replacement asphaltic concrete so that at all times the length of open "trench" is at a minimum. If the contractor's production of replacement asphaltic concrete is stopped for any reason, the removal of asphaltic concrete shall either cease or shall be reduced. The Engineer will be the sole judge as to whether the removal shall cease or be reduced. The Engineer's decision will be based on the reason for the stoppage in asphaltic concrete production, the expected length of the stoppage, the type and depth of the material being removed, and the time of day.

Replacement asphaltic concrete shall be placed as soon as possible after the "trench" has been opened up. The surface on which the material is to be placed shall be uniform and free of loose material. Any exposed base material shall be compacted to the extent required by the Engineer.

The "trench" in which asphaltic concrete is being placed shall be filled before the end of each day's work and the lane shall be opened to traffic. The length of open "trench" at any one time shall not exceed two miles or half the length of the work, whichever is the lesser.

In the event of circumstances beyond the control of the contractor, such as equipment breakdown, or if the production of the replacement asphaltic concrete has been stopped by the Engineer and the contractor is unable to comply with the requirements in the preceding paragraph, the contractor shall provide and maintain such traffic control devices that the Engineer deems necessary under the circumstances in order to provide safe and efficient passage through the work zone.

If the Engineer deems it to be warranted, the Engineer will require that the contractor provide for the surface drainage of areas where the pavement surface has temporarily been removed.

Pavement, to be removed by milling, adjacent to manholes, valve boxes, small radius curbs and other fixed objects that produce confined areas shall be removed with milling equipment specifically designed to operate in restricted areas and capable of removing asphaltic concrete of the specified thickness without damage or displacement of the adjacent object.

On projects with existing curb and gutter, any asphaltic concrete buildup in the gutter designated to be removed, shall be removed prior to the pavement removal operation by equipment and methods approved by the Engineer. The equipment and methods used

shall be capable of removing the asphaltic concrete buildup without causing damage to the curb and gutter.

202-3.04 Removal of Miscellaneous Concrete:

Miscellaneous concrete shall be defined as all or portions of mortared rubble masonry, curbs, gutters, sidewalks, driveways, aprons, slope paving, island paving, retaining walls, spillways, drainage structures, concrete box culverts, foundations, footings and all other Portland cement concrete or masonry construction, except bridges and pavement. All existing miscellaneous concrete shall be removed to a depth of at least five feet below finished subgrade elevation unless otherwise specified in the Special Provisions or on the project plans.

Where new concrete is to join existing concrete, the existing concrete shall be saw cut to a true line with straight vertical edges free from irregularities.

Concrete removal operations shall be performed without damage to any portion that is to remain in place. All damage to the existing concrete, which is to remain in place, shall be repaired to a condition equal to that existing prior to the beginning of removal operations. The repairing of existing concrete damaged by the contractor's operations shall be at no additional cost to the Department.

Existing reinforcement that is to be incorporated in new work shall be protected from damage and shall be thoroughly cleaned of all adhering material before being embedded in new concrete.

Concrete shall be disposed of as provided in Subsection 202-3.03(A).

The floors of concrete basements, pits and structures, that are not required to be removed and which are located within the roadway shall be broken in a manner that will prevent the entrapment of water.

202-3.05 Removal of Bridges:

The removal of existing bridges, either wholly or in part, shall be as shown on the project plans or as described in the Special Provisions. Bridge removal operations shall be conducted in such a manner as to cause the least interference to public traffic.

At least ten days before beginning bridge removal over or adjacent to public traffic or railroad property, the contractor shall submit to the Engineer details of the removal operations showing the methods and sequence of removal and equipment to be used.

When total bridge removal is specified, all materials designated for salvage, such as structural steel, structural steel members, timber and other reusable materials shall be carefully dismantled, removed and salvaged in accordance with the requirements of Subsection 202-3.01. Steel members shall be match marked as directed by the Engineer.

Piling, piers, abutments, footings and pedestals shall be removed to at least one foot below ground line or five feet below finished subgrade elevation unless specified otherwise in the Special Provisions or on the project plans.

When partial bridge removal is specified or alteration of an existing bridge requires removal of portions of the existing structure, such removal shall be performed with sufficient care as to leave the remaining portion of the structure undamaged.

In case of damage to the existing bridge structure, the contractor shall make all necessary repairs at no additional cost to the Department. Reinforcing steel extending from the remaining portion of the structure shall be protected, cleaned and incorporated in the new portion of the structure in accordance with the details shown on the project plans or as directed by the Engineer.

Flame cutting and saw cutting may be used for removing, widening, or modifying bridges provided the contractor complies with all protection, safety and damage requirements.

Explosives shall not be used in bridge removal operations unless approved by the Engineer.

Before beginning concrete removal operations involving the removal of a portion of a monolithic concrete element, a saw cut approximately one inch deep shall be made to a true line along the limits of removal on all faces of the element which will be visible in the completed work.

Concrete shall be disposed of as provided in Subsection 202-3.03(A).

202-3.06 Removal of Signs and Delineators:

Existing warning, regulatory, guide, route marker signs and delineators that are to be removed will be designated by the Engineer. The contractor shall dismantle the sign panels and delineators and remove the sign posts from the ground in such a manner as to prevent damage to the posts. The contractor shall not remove the existing signs prior to the completion of the new sign installation, but shall remove them within five working days after the installation of the new signs or as directed by the Engineer. Signs, delineators, and sign posts shall be removed and salvaged in accordance with the requirements of Subsection 202-3.01.

202-3.07 Removal of Embankment Curb:

The existing embankment curb, down-drain inlets and spillway inlets, designated on the project plans to be removed, shall be removed in such a manner as to preserve the existing bituminous surfacing.

Asphaltic concrete obtained either from commercial or other sources and approved by the Engineer shall be used to fill and repair voids on the existing pavement surface that result from the removals.

202-3.08 Removal of Fence:

All fence to be removed, shall become the property of the contractor unless designated for salvage on the project plans. If fence is designated to be removed and salvaged, all fence, including gates shall be salvaged in accordance with the requirements of Subsection 202-3.01.

When designated for salvage, fence and gates shall be carefully dismantled and neatly rolled or coiled. Posts shall be cleaned of all concrete and dirt.

In areas where new fence or relocated fence is to be installed, the contractor shall perform the removals in such a manner as to prevent the escape of any livestock.

202-3.09 Removal of Guardrail:

All guardrail to be removed, shall become the property of the contractor unless otherwise specified on the project plans.

If guardrail is designated to be removed and salvaged, the contractor shall carefully dismantle the guardrail and remove the blocks and posts in such a manner as to prevent any damage to the removed items. The guardrail, including panels, end sections, posts and all hardware shall be salvaged in accordance with the requirements of Subsection 202-3.01.

202-4 Method of Measurement:

Removal of structures and obstructions will be measured on a lump sum basis except that when the bidding schedule contains specific items under this section on a unit basis, measurement will be made by the units designated in the bidding schedule.

202-5 Basis of Payment:

Payment for the accepted quantities of removal of structures and obstructions will be made by lump sum or by specific removal items or by a combination of both. Payment for removal of structures and obstructions not listed in the bidding schedule, but necessary to perform the construction operations designated on the project plans or specified in the Special Provisions shall be considered as included in the prices of contract items.

The prices shall include all excavation and subsequent backfill incidental to the removals, the furnishing and placing of asphaltic concrete to fill and repair voids resulting from the work under Subsection 202-3.07, compaction of base material resulting from the work under Subsection 202-3.03(C), and the salvaging, hauling, storing and disposing of all materials as provided herein.

SECTION 203 EARTHWORK:

203-1 Description:

The work under this section shall consist of performing all operations necessary to excavate all materials, regardless of character and subsurface conditions, from the roadway or

adjacent thereto; to excavate drainage and irrigation ditches and channels; to excavate for structures, culverts, and other facilities; to furnish and place borrow material for use as specified; to construct embankments; to place backfills for structures, culverts and other facilities; to backfill holes, pits and other depressions within the roadway area; to remove and replace unsuitable material; to excavate and grade road approaches, driveways and connections; to construct dikes and berms; and to apply water for compaction, all as designated on the project plans, specified in the Special Provisions, or directed by the Engineer.

203-2 General:

Operations shall be conducted such that existing highway facilities, utilities, railroad tracks and other nonhighway facilities which are to remain in place will not be damaged. The contractor, at its expense, shall furnish and install sheet piling, cribbing, bulkheads, shoring, or provide whatever means necessary to adequately support the facilities which are to remain, and maintain such supports until they are no longer needed. Temporary pavements, facilities, utilities, and installations shall also be protected until they are no longer required. When temporary supports and other protective means are no longer required, they shall be removed and disposed of by the contractor.

When hauling is done over highways or city streets, the loads shall comply with legal load requirements, all material shall be removed from shelf areas of vehicles in order to eliminate spilling of material, and loads shall be watered or covered to eliminate dust.

The bidding schedule quantities for roadway excavation, drainage excavation, and borrow, if applicable, will be considered to be the final quantities for payment unless adjusted in accordance with the requirements of Subsections 104.02 or 203-2.01.

All suitable material removed from excavated areas within the project limits shall be used in the construction of embankments and other designated areas.

203-2.01 Earthwork Adjustments:

Adjustments in the bidding schedule quantities for roadway excavation, drainage excavation, or borrow may be initiated by the contractor or the Engineer if evidence indicates that the required quantity varies by an amount greater than five percent of the bidding schedule quantity. The contractor shall advise the Engineer in writing, submitting evidence in the form of a construction survey or photogrammetric survey with measurement for the proposed adjustment substantiated in accordance with Subsections 203-3.04, 203-4.04 and 203-9.04 and requesting an adjustment in quantities. The Engineer will determine the amount of adjustment, if any. The quantity upon which payment will be based will be the bidding schedule quantity plus or minus only that portion of the adjustment that exceeds five percent of the bidding schedule quantity.

Should the item of earthwork to be adjusted also be a major item, as specified in Subsections 101.42 and 104.02, the determination as to whether the unit price may be adjusted will be based on the difference between the final quantity and the bid schedule quantity plus or minus the five percent tolerance.

Neither variations in shrink or swell of material from those shown on plans, nor variations of shrink or swell from contractor obtained sources will be reason for establishing a quantity adjustment.

Adjustments in earthwork quantities due to revisions ordered by the Engineer will be isolated by measurement or calculations in accordance with the requirements of Subsections 203-3.04, 203-4.04 and 203-9.04. The bidding schedule quantities will be adjusted by the amount of the ordered change and will not be included in any other adjustment of the bidding schedule quantities as specified in this subsection.

203-3 Roadway Excavation:

203-3.01 Description:

Roadway excavation shall consist of excavating, grading, and hauling all types of materials encountered in constructing the roadway, lookouts, parking areas, turnouts, driveway entrances, ditches within the roadway, and other road-related areas as designated on the plans or specified in the Special Provisions; and the placement and compaction of excavated material in embankments as provided under Subsection 203-10.

Roadway excavation will not include drainage excavation or structural excavation when these items are designated as separate items of work in the bidding schedule.

203-3.02 Blank

203-3.03 Construction Requirements:

(A) General:

All roadway excavation shall be finished to a reasonably smooth, uniform surface; shall not vary by more than 0.04 feet above or below the grade established; and shall be in reasonably close conformance to the lines, dimensions and cross-sections shown on the project or established by the Engineer. When Portland Cement Concrete Pavement or Asphaltic Concrete Pavement are to be placed directly on the subgrade, the finished surface shall not vary by more than 0.02 feet above or 0.04 feet below the established grade. When roadway excavation is made in rock, the full cross-section width of the roadway between the ditches shall be over-excavated a minimum depth of six inches below the subgrade elevation. The over-excavated area shall be filled with embankment material satisfactory to the Engineer and compacted and finished in accordance with the requirements of the specifications. In situations where only part of the roadway section intersects areas of rock, that portion occurring in the rock zone shall be over-excavated and backfilled as specified above.

No measurement or direct payment will be made for the work in over-excavating the rock areas, or placing the embankment material, the cost being considered as included in the cost of contract items.

All suitable excavated material shall be used in the construction of embankments or in other designated areas.

No excavated material shall be wasted without the approval of the Engineer. Wasted material shall be disposed of by the contractor in a manner approved by the Engineer and in accordance with Subsection 107.11.

During construction, the roadway shall be maintained in a well-drained condition at all times.

The top six inches of the subgrade shall be compacted to a density of not less than 95 percent of the maximum density as determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer, except that, when asphaltic concrete or Portland cement concrete is to be placed directly on subgrade, the required density shall be 100 percent of the maximum density.

(B) Slopes:

Earth slopes shall be finished to reasonably smooth surfaces and shall be free of all debris and loose material.

All shattered or loosened material shall be removed from rock cut slopes.

Adjustments in slopes shall be made, as directed by the Engineer, to avoid damage to standing trees, marring weathered rock or to harmonize with existing landscape features. The transition of such adjusted slopes shall be gradual. At the intersections of cuts and fills, slopes shall be adjusted and warped to flow into each other or into the natural ground surfaces without noticeable break.

Except in rock, the intersection of roadway cut slopes with the ground surfaces shall be rounded as shown on the plans or as directed by the Engineer. Rock that is disintegrated to such an extent that it will work and handle as earth shall be considered as earth, and the slopes shall be rounded the same as earth slopes. When earth overlays a rock cut, the top of slope shall be rounded in the same manner as earth slopes.

Where directed by the Engineer, the top six inches of topsoil, including duff, within the limits of the rounding, shall be removed and windrowed outside of the rounding limits. After completion of the rounding of the slope, the windrowed materials shall be uniformly spread over the rounded area.

(C) Blasting:

(1) General:

Overshooting or any method of blasting that might cause damage to the roadway section or highway structures, or that might be dangerous or destructive to adjacent property or

landscape, will not be permitted. The contractor shall provide and install suitable protection for all trees, shrubbery, pole lines and other existing facilities within the adjacent area.

(2) Controlled Blasting:

When controlled blasting is specified in the Special Provisions, all blasting in connection with roadway excavation shall be performed in accordance with the requirements of these specifications. Should the Engineer determine that controlled blasting procedures are to be followed, and such procedures are not specified in the Special Provisions, payment for any additional work will be made in accordance with Subsection 104.02.

Prior to any blasting operations that require controlled blasting, the contractor shall furnish the Engineer a written statement setting forth the details and materials to be used in the pre-splitting operations. The written statement shall include spacing of the drill holes, depth of the holes, amount of explosives to be used in each hole, method of loading, stemming depth, and the time delay between detonations. If the initial results obtained using the proposed method are satisfactory in relation to the character of the material to be pre-split, the procedures shall be continued. If, in the opinion of the Engineer, the results of the blasting are considered unsatisfactory for any reason, the contractor shall submit corrective modifications of the plan to the Engineer for review.

Drill holes for pre-splitting shall be spaced at centers not exceeding three feet and shall be drilled as near to the design slope lines and as parallel to one another as possible. Pre-drilling and pre-splitting to depths greater than one lift (approximately 20 feet) will be permitted only if satisfactory hole alignment is maintained.

Explosive charges placed in slope-drilled holes shall be uniformly spaced along the length of hole and shall be as light as possible to effect clean splitting of the rock along the plane of the slope and to minimize the fracturing of the remaining rock face or cut.

Loading of slope-drilled holes shall be by string charges connected so that all charges in a hole and all holes in the designated section are exploded simultaneously. Explosives for pre-splitting shall be detonated at least several milliseconds in advance of primary blasting. Primary blasting shall be accomplished by means of millisecond delay excavation blasting methods.

(D) Unsuitable Material:

Material below the natural ground surface in embankment areas and below the finished subgrade elevation in excavation areas that is unsuitable shall be excavated and disposed of as directed by the Engineer.

When unsuitable material is removed and disposed of, the resulting space shall be filled with material suitable for the planned use. Such suitable material shall be placed and compacted in accordance with the requirements of Subsection 203-10.

(E) Surplus Material:

Unless otherwise indicated on the project plans or specified in the Special Provisions, surplus excavated material shall be removed from the job site and disposed of by the contractor in a manner approved by the Engineer and in accordance with the requirements of Subsection 107.11.

Surplus material shall not be removed from the job site until the work specified in Subsection 203-1 has been completed or when approved by the Engineer. Any surplus material removed prior to the completion of the specified work, which must subsequently be replaced, shall be at no additional cost to the Department.

203-3.04 Method of Measurement:

Measurement of roadway excavation for payment will not be required unless adjustments are made in accordance with Subsection 203-2.01. When adjustments are required, roadway excavation will be measured by the cubic yard in the original space occupied and the volume of material removed will be computed in cubic yards by the average end area method.

Excavation originating outside of the neat lines of cut slopes as a result of necessary blasting operations will not be measured for additional payment.

203-3.05 Basis of Payment:

The quantities of roadway excavation as shown in the bidding schedule and any adjustments as specified in Subsection 203-2.01, will be paid for at the contract unit price per cubic yard. The price shall include full compensation for the work complete, in place, including slope rounding, blasting, hauling, stockpiling, placing and compacting embankments, disposal of surplus material, and preparation of the subgrade in accordance with the requirements of these specifications.

Payment for removal of slides which are not deemed to be the result of carelessness on the part of the contractor will be made in accordance with the requirements of Subsection 104.02.

When unsuitable material is removed, as specified in Subsection 203-3.03(D), payment for this work will be in accordance with the requirements of Subsection 104.02. No adjustment to the contract unit price will be made because of increased excavation quantities resulting from the removal of unsuitable material.

203-4 Drainage Excavation:

203-4.01 Description:

Drainage excavation shall consist of the excavation of ditches, channels or waterways, except that excavation which is required to construct ditches paralleling the roadway and constituting a part of the roadway prism shall be considered as roadway excavation.

203-4.02 Blank

203-4.03 Construction Requirements:

Ditches, channels and waterways shall be constructed in reasonably close conformity to the lines and grades shown on the plans or as directed by the Engineer.

When directed by the Engineer to provide outfall, ditches, channels and waterways shall be continued outside the limits of the right-of-way. Prior to performing work outside the right-of-way, the Engineer will obtain proper authorization from the property owner. All waterways shall be constructed to drain effectively.

Suitable materials from ditch, channel or waterway excavation shall be used in the construction of embankment or for other purposes as shown on the project plans or specified in the Special Provisions. Unsuitable and surplus excavation material shall be disposed of as directed by the Engineer.

203-4.04 Method of Measurement:

Measurement of drainage excavation for payment will not be required unless adjustments are made in accordance with Subsection 203-2.01. When adjustments are required, drainage excavation will be measured by the cubic yard in the original space occupied and the volume of material removed will be computed in cubic yards by the average end area method.

203-4.05 Basis of Payment:

The quantities of drainage excavation shown in the bidding schedule and any adjustments as specified in Subsection 203-2.01, will be paid for at the contract unit price per cubic yard.

The unit price per cubic yard shall include hauling, placing and compacting the excavated material to form embankments or other features shown on the plans or directed by the Engineer and disposal of all surplus excavated material.

Payment for grader ditches and crown ditches will be made as specified under Subsections 203-6 and 203-7, respectively.

203-5 Structural Excavation and Structure Backfill:

203-5.01 Description:

Structural excavation shall consist of the excavation and removal of all materials necessary for the construction of bridges, concrete box culverts, inlet and outlet wings, retaining walls or other specific items designated on the project plans or in the Special Provisions as structural excavation; the control and removal of water, the construction or installation of all facilities necessary to accomplish the work, and the subsequent removal of such facilities, except when designated on the project plans or specified in the Special Provisions to remain in place.

Structure backfill shall consist of furnishing, placing and compacting backfill material around structures to the lines designated on the plans, specified in the Special Provisions, directed by the Engineer and as specified herein.

The work under this section includes the furnishing and installing of a geocomposite drainage system as an abutment or retaining wall drainage when specified in the plans. All geocomposite drainage materials and installation shall be as approved by the Engineer.

203-5.02 Materials:

(A) Geocomposite Drain:

The geocomposite wall drain materials shall conform to the requirements of Subsections 1014-1 and 1014-6.

(B) Geocomposite Packaging, Handling, and Storage:

The identification, packaging, handling, and storage of the geocomposite wall drain material shall be in accordance with ASTM D 4873. Geocomposite wall drain shall be furnished in rolls, or in another acceptable manner, wrapped with a suitable protective covering to protect the fabric from mud, dirt, dust, debris or harmful ultraviolet light. The wall drain material shall be free of defects or flaws which significantly affect its physical properties at the time of delivery and installation. Each roll or package shall be labeled or tagged to provide product identification sufficient to determine the product type, manufacturer, quantity, lot number, roll number, date of manufacture, shipping date, and the project number and name to which it is assigned. Geocomposite wall drain materials shall be stored on the site or at another location approved by the Engineer in a manner which protects them from the elements. If stored outdoors, the materials shall be elevated and protected with a light colored, opaque, waterproof cover. At no time shall the geocomposite wall drain materials be exposed to direct sunlight for a period exceeding 14 days.

203-5.03 Construction Requirements:

(A) Excavation:

The contractor shall notify the Engineer sufficiently in advance of the beginning of excavation to allow measurements to be taken of the undisturbed ground. The required excavation shall then be performed in reasonably close conformity to the lines, grades and cross sections established by the Engineer or shown on the plans.

In lieu of providing approved shoring methods, the sides of excavations may be sloped as required by soil conditions to stabilize the sides for safe working conditions. Side slopes shall conform to the requirements specified in current OSHA regulations and be approved by the Engineer.

When structure footings, concrete box culverts or other structures are to rest on an excavated surface other than rock and no piles are used, care shall be taken to protect the surface from water and not disturb the bottom of the excavation. If suitable material in the

bottom of the excavation is disturbed or is removed for the contractor's convenience, the foundation shall be restored by the contractor, at its expense, to a condition at least equal to the undisturbed foundation as determined by the Engineer.

When material at the planned grade of the excavation is determined by the Engineer to be unsuitable, such material shall be removed to the limits directed by the Engineer and the resulting excavation backfilled with structure backfill material.

When structures are to rest on rock, the surface shall be removed to a depth sufficient to expose sound rock. The rock shall be roughly leveled or cut to steps, and the surface roughened. Any seams in the rock shall be grouted under pressure or treated as directed by the Engineer.

Where rock or other unyielding material is encountered at the planned grade of a structure and a yielding material is encountered in an adjacent area for the same structure, the unyielding material shall be removed to a minimum depth of two feet below grade and replaced with structure backfill conforming to the requirements of Subsection 203-5.03(B).

When structures are to be supported on piles, excavations shall be completed to the bottom of the footings before any piles are drilled or driven therein. When swell or subsidence results from driving piles, the contractor shall, at its expense, excavate or backfill with suitable material the footing area to the grade of the bottom of the footings as shown on the project plans.

When during the course of structural excavation, material is removed outside the designated pay limits, the contractor shall backfill said excavated areas in accordance with the requirements for structure backfill as specified herein, and no compensation will be made for the additional material or work required.

Excavated material which is suitable for and not used as structure backfill shall be used either for the construction of embankment or in filling other areas as designated on the plans. Material which, in the opinion of the Engineer, is not suitable for use or which is deemed surplus shall be disposed of in accordance with Subsection 203-3.

Prior to placing concrete or masonry the area excavated shall be inspected and approved by the Engineer.

(B) Backfill:

(1) Structure Backfill:

Structure backfill material shall be selected from excavation or from a source selected by the contractor. It shall not contain frozen lumps, chunks of clay, or other objectionable material. Backfill material shall not contain salvaged asphaltic concrete materials. Backfill material shall have a value of resistivity not less than 2,000 ohm-centimeters. Backfill material to be used for metal piles or similar items of metal shall have a value of resistivity not less than 2,000 ohm-centimeters or the value shown on the plans. Backfill material shall have a pH value between 6.0 and 10.0, inclusive, when placed against metal

installations, except aluminum. Backfill material shall have a pH value between 6.0 and 9.0, inclusive, when placed against aluminum installations. Backfill material shall have a pH value between 6.0 and 12.0, inclusive, when placed against installations other than metal. Tests for pH and resistivity shall be in accordance with the requirements of Arizona Test Method 236.

Structure backfill material shall conform to the following gradation (Arizona Test Method 201):

Sieve Size	Percent Passing
3 inch	100
3/4 inch	60 - 100
No. 8	35 - 80
No. 200	0 - 12

The plasticity index shall not exceed 5 when tested in accordance with the requirements of AASHTO T 90.

(2) Use of Slurry:

As an alternate to the material requirements of Structural Backfill, the Engineer may allow material conforming to the following requirements to be used in a slurry mixture in situations where the slurry will be confined by free-draining soils (Arizona Test Method 201):

Sieve Size	Percent Passing
1-1/2 inch	100
1 inch	90 - 100
No. 8	35 - 80
No. 200	0 - 8.0

The plasticity index shall not exceed 8 when tested in accordance with the requirements of AASHTO T 90.

(3) Placement of Backfill:

All earth material which has loosened or collapsed into the excavation from the adjacent ground and all trash, forms, and loose large rock shall be removed from the excavation before backfill is placed.

Backfill material shall not be placed against the back of concrete abutments, concrete retaining walls, or cast-in-place concrete structures until the concrete has developed its full design strength.

Backfill material shall not be placed against concrete structures not designed to retain earth loads until the concrete has attained a minimum compressive strength of 2,000 pounds per square inch and in no case before 72 hours after casting. Backfill shall be placed uniformly

on each side of the structure, and at all times during placement shall be not more than two feet above any other side.

Unless otherwise shown on the plans or designated in the Special Provisions, minor structures such as catch basins or cattle guards which are furnished as precast structures shall be placed on a layer of structure backfill at least six inches in depth. The layer shall have been shaped to fit the bottom surface of the precast unit and compacted to a density of not less than 100 percent of the maximum density as determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer. At the time the unit is placed, the moisture content of the layer shall be at or near the optimum moisture as determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer. After the unit has been initially set in place and checked for line and grade, it shall be removed and any defects in its bearing area shall be corrected by trimming and by placing and compacting similarly moistened structure backfill. The process of removal, correction and replacement shall continue until the imprint of the unit on the bearing area indicates essentially uniform contact, and the unit is in reasonable conformity with the lines and grades shown on the project plans.

Where a structure is located within a paved area, all backfill material above finished subgrade elevation shall conform to the requirements of the typical pavement section of the same elevations.

Backfill compacted by pneumatic or mechanical tamping devices, shall be placed in layers not more than eight inches in depth before compaction.

Backfill material placed as a slurry shall be placed in uniform layers not exceeding four feet in depth. The maximum water content of the slurry mixture shall be 40 gallons of water per ton of backfill material. Aggregate slurry shall be thoroughly mixed in a mixer approved by the Engineer. Unless otherwise approved by the Engineer, the slurry shall be compacted with internal vibrators in accordance with the requirements of Subsection 601-3.03(D).

(4) Compaction of Backfill:

Backfill material shall be compacted to at least 95 percent of the maximum density as determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer.

Backfill material may be compacted by either mechanical or pneumatic tamping devices or backfill material may be placed as a slurry. Compaction equipment or methods which may cause excessive displacement shall not be used.

If backfill is placed as a slurry, and when directed by the Engineer, the contractor shall excavate holes in the compacted slurry to the depths and at the locations designated by the Engineer. Upon completion of the tests, the contractor shall refill the excavated areas and compact the material to the required density in a manner approved by the Engineer.

(C) Geocomposite Wall Drain:

Geocomposite wall drains shall be installed on the soil side of abutment walls, wing walls, retaining walls, and culvert sidewalls. The concrete surface of the structure against which the geocomposite drain is to be placed shall be free of soil, debris and excessive irregularities that will prevent continuous contact between the concrete surface and the drain material. The geocomposite drain shall be installed with the single fabric surface in contact with the backfill material. When the core of the geocomposite wall drain is not perforated during manufacture, perforations shall be made in the core where the wall drain will lay against a weephole or other drainage outlet. When making these perforations, the fabric shall not be damaged in any way.

Unless otherwise specified, geocomposite wall drains shall be constructed in horizontal courses and in accordance with the details shown on the plans. To prevent infiltration of the backfill material, the geocomposite material shall be firmly secured to the face, top and sides of the wall by using adhesive or 1.5 to 2 inch long concrete nails with approved washers or wood battens of not less than four square inches in area. The adhesive or alignment of the core shall not affect the drainage area or downward flow within the core. The spacing of concrete nails shall be as directed by the Engineer, but shall not be more than four feet apart, both horizontally and vertically. When nails are utilized, there shall be at least one horizontal row of nails in each course of geocomposite.

Horizontal seams shall be formed by utilizing the four-inch flap of geotextile fabric extending from the upper geocomposite course and lapping over the top of the fabric on the next lower course. The fabric flap shall be securely fastened to the lower fabric by means of a continuous strip of three-inch wide, waterproof plastic tape.

Where vertical splices are necessary at the end of a geocomposite roll or panel, an eight-inch wide continuous strip of geotextile fabric may be placed, centering over the seam and continuously fastened on both sides with the three-inch wide, waterproof plastic tape.

As an alternative method of splicing, either horizontally or vertically, rolls of geocomposite drain material may be joined together by turning back the fabric at the roll edges and interlocking the cuspatations approximately two inches. For overlapping in this manner, the fabric is then lapped over and tightly taped beyond the seam with the three-inch wide, waterproof tape. Interlocking of the core shall always be in the direction of water flow.

To prevent soil intrusion, all exposed edges of the geocomposite drainage core shall be covered by tucking the four-inch fabric lap over and behind the core edge. Alternatively, a 12-inch wide strip of fabric may be utilized in the same manner, taping it to the exposed fabric eight inches in from the edge with a continuous strip of three-inch wide, waterproof, plastic tape and folding the remaining four inches over and behind the core edge.

Should the fabric become damaged during installation by tearing or puncturing, the damaged section shall be cut out and replaced completely. If, in the judgment of the Engineer, the damage is not serious enough to warrant removal, the damaged area may be repaired by overlaying with a piece of fabric, large enough to cover the damaged area and provide a four-inch overlap on all sides, and taping it in place with three-inch wide strips of waterproof, plastic tape.

Structural backfill operations shall be started as soon as possible after placing the geocomposite material, but in no case shall the geocomposite material be exposed to sunlight for more than 14 days after installation. Care shall be taken during the backfill operation not to damage the geotextile surface of the drain and to avoid excessive settlement of the backfill material.

203-5.04 Method of Measurement:

(A) Structural Excavation:

Structural excavation will be measured for payment by the cubic yard based on the volume calculated from the pay limits shown on the plans.

No deduction will be made from the pay quantities when the contractor elects not to excavate material which is within the pay limits shown on the plans.

Where it is necessary to excavate to a greater depth than shown on the plans for a footing, or to remove unsuitable material in accordance with the requirements of Subsection 203-5.03(A), such additional excavation which is less than three feet below the elevation shown on the plans will be measured for payment as structural excavation.

No measurement for payment will be made of excavation required because of slides, cave-ins, silting or filling due to the lack of support of sides, the action of the elements or the carelessness of the contractor.

No measurement for payment will be made for structural excavation when structures are to be supported on piles or drilled shafts in new embankment sections.

(B) Structure Backfill:

Structure backfill will be measured by the cubic yard of material based on the volume calculated from the pay limits shown on the plans.

203-5.05 Basis of Payment:

The accepted quantities of structural excavation and structure backfill, measured as provided above, will be paid for at the contract unit price. The price shall be full compensation for the work complete as hereinbefore specified.

Full compensation for hauling, placing and compacting surplus structural excavation in embankments or otherwise disposing of the material shall be considered as included in the contract price paid for excavating the material.

Payment for additional excavation, where it is found necessary to excavate to a depth greater than three feet below the elevation shown on the plans for a footing, to treat seams in rock, or to remove unsuitable material in accordance with the requirements of Subsection 203-5.03(A), will be made in accordance with the provisions of Subsection 104.02.

No measurement or payment will be made for furnishing and installing geocomposite drains, the cost being considered as included in the cost of contract items.

203-6 Grader Ditch:

203-6.01 Description:

Grader ditch shall consist of a triangular shaped ditch as detailed on the plans, excavated and finished with a motor grader or similar type equipment.

203-6.02 Blank

203-6.03 Construction Requirements:

Grader ditches shall be constructed at the locations designated on the plans or as directed by the Engineer.

203-6.04 Method of Measurement:

Grader ditch will be measured by the linear foot along the center line of the ditch, parallel to the ground surface.

203-6.05 Basis of Payment:

The accepted quantities of grader ditch, measured as provided above, will be paid for at the contract unit price per linear foot.

203-7 Crown Ditches:

203-7.01 Description:

Crown ditches shall consist of excavating and finishing ditches, as detailed on the plans, to intercept surface water.

203-7.02 Blank

203-7.03 Construction Requirements:

Crown ditches shall be constructed at the locations designated on the plans or as directed by the Engineer.

203-7.04 Method of Measurement:

Crown ditches will be measured by the linear foot along the center line of the ditch, parallel to the ground surface.

203-7.05 Basis of Payment:

The accepted quantities of crown ditches, measured as provided above, will be paid for at the contract unit price per linear foot.

203-8 Crown Dike:

203-8.01 Description:

Crown dikes shall consist of placing material to the lines and grades required to intercept the flow of the surface water and to direct it down continuing slopes to an appropriate discharge point.

203-8.02 Blank

203-8.03 Construction Requirements:

Crown dikes shall be constructed as designated on the plans or as directed by the Engineer.

The material shall be placed in layers not exceeding eight inches in depth before compaction and compacted to a density of at least 95 percent of the maximum density as determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer.

203-8.04 Method of Measurement:

Crown dike will be measured by the linear foot along the center line of the dike, parallel to the ground surface.

203-8.05 Basis of Payment:

The accepted quantities of crown dike, measured as provided above, will be paid for at the contract unit price per linear foot. Water used in construction will be paid for in accordance with Section 206.

203-9 Borrow:

203-9.01 Description:

The work under this section shall consist of furnishing and placing suitable and satisfactory material obtained from sites outside of the right-of-way for use in embankments, shoulders, berms, dikes and other similar purposes. The widening of roadway cuts and ditches and similar work within the right-of-way shall be considered as roadway excavation, not borrow.

203-9.02 Materials:

Borrow shall be secured from material sources in accordance with the requirements of Section 1001. The material shall be of a quality suitable for the purpose intended, free of

vegetation or other unsatisfactory material. Borrow placed within three feet of the finished subgrade elevation shall conform to the requirements of the Special Provisions.

203-9.03 Construction Requirements:

Borrow material shall be placed in accordance with the requirements of Subsection 203-10.

203-9.04 Method of Measurement:

Measurement of borrow for payment will not be required unless adjustments are made in accordance with Subsection 203-2.01. When adjustments are required, Borrow will be documented for payment as shown in the bidding schedule by either of the two following methods:

(A) Borrow (Pit):

When the contract provides for Borrow (Pit), the borrow will be measured by the cubic yard in the original space occupied and volume of material removed will be computed in cubic yards by the average end area method.

(B) Borrow (In Place):

When the contract provides for Borrow (In Place), the borrow will be calculated by the cubic yard in the final space occupied and volume of material placed will be computed in cubic yards by the average end area method.

No measurement for payment will be made for borrow material placed prior to completion of roadway excavation, drainage excavation or structural excavation, when such placement results in unauthorized wasting of roadway, drainage or structural excavation materials.

203-9.05 Basis of Payment:

The quantities of borrow as shown in the bidding schedule and adjustments to same as described in Subsection 203-2.01, will be paid for at the contract unit price per cubic yard. The price shall be full compensation for the item complete in place, including furnishing, hauling, placing and compacting the material, and applying water. Water used in construction will be paid for in accordance with Section 206.

203-10 Embankment Requirements:

203-10.01 Description:

Embankment requirements shall apply to the construction of roadway embankments, including the widening of embankment sections with surplus material and the preparation of the areas upon which embankment material is to be placed; the construction of dikes and berms; the placing and compacting of material where unsuitable material has been removed; and the placing and compacting of embankment material in holes, pits and other

depressions within the roadway area, in accordance with the requirements of these specifications.

203-10.02 Embankment Materials:

(A) Metal Pile Locations:

Where metal piles are to be driven through a newly placed embankment, the embankment material within ten feet of the pile shall have a value of resistivity not less than 2000 ohm-centimeters or the value shown on the plans, whichever is less. When resistivity is not shown on the plans, Embankment material shall have a pH value between 6.0 and 9.0, inclusive. Tests for pH and resistivity shall be in accordance with the requirements of Arizona Test Method 236.

(B) Drilled Shaft Locations:

Embankment material containing broken concrete, rock, or other solid material which is larger than 12 inches in its greatest dimension shall not be placed horizontally within 10 feet or three shaft diameters, whichever is greater, of any proposed drilled shaft.

(C) Abutment, Wingwall and Anchor Slab Locations:

Embankment material placed adjacent to bridge abutments and wingwalls, as shown on the plans or as directed by the Engineer, will be structure backfill and shall conform to the requirements specified in Subsection 203-5. The limits of the structure backfill material placed adjacent to abutments and wingwalls shall be as shown on the plans or as directed by the Engineer. Fill materials shall not be placed against the back of abutments or wingwalls until the concrete has reached design strength.

When anchor slabs are specified, the embankment material placed under and adjacent to the anchor slabs shall be of a cohesive nature which will allow a neat line excavation of the anchor slab lugs.

203-10.03 Embankment Construction Requirements:

(A) Placement:

All embankments shall be constructed to a reasonably smooth and uniform surface and shall not vary by more than 0.04 feet above or below the grade established and in reasonably close conformity to the lines, dimensions and cross sections shown on the project plans or established by the Engineer. When Portland Cement Concrete Pavement or Asphaltic Concrete Pavement are to be placed directly on the subgrade, the finished surface shall not vary by more than 0.02 feet above or 0.04 feet below the established grade.

All embankment material, whether from sources within the site or from borrow, to be placed within three feet of the finished subgrade elevation shall have a resilient modulus value equal to or greater than the design resilient modulus value for the pavement structure.

Embankment construction shall not be started until clearing and grubbing for the embankment area is completed in accordance with the requirements of Section 201. When embankment material is to be placed over existing bituminous surfacing, the surfacing shall be scarified prior to placing embankment material, unless otherwise directed by the Engineer. When directed by the Engineer, surplus material or unsuitable material, as specified in Subsection 203-3.03, shall be disposed of by flattening embankment slopes within the project limits.

In constructing embankments on hillsides, or against existing embankments or when constructing embankments one half width at a time, the slopes of the original hillside except where solid rock is encountered, the existing embankments, or the half width of new embankments shall be cut into a minimum of six feet horizontally, as the work is brought up in layers, in order to minimize the possibility of slippage between the existing materials and the new embankment material. The material thus cut out shall be re-compacted along with the new embankment material.

Embankment of earth material shall be placed in uniform horizontal layers not exceeding eight inches in depth before compaction and shall be compacted in accordance with the requirements of these specifications before the next layer is placed.

When the embankment material, resulting from the required excavations, consists predominately of rock fragments of such size that the material cannot be placed in an eight-inch layer without crushing, pulverizing or further breaking down the pieces, such material may be placed in the embankment in layers not exceeding in thickness the approximate average size of the larger rocks being excavated, but not larger than two feet. It may be necessary to reduce the size of the excavated material by crushing or otherwise breaking down the material in order to comply with this requirement.

The placing of individual rocks and boulders greater than 24 inches in diameter will be permitted provided they do not exceed 36 inches in maximum dimension, are carefully distributed to prevent nesting and the interstices are filled with finer material and compacted to form a dense and compact mass. Each layer shall be leveled and smoothed by evenly distributing spalls and finer fragments of rock and earthen material with suitable leveling equipment.

Embankment material containing broken concrete, rock, or other solid materials which are larger than six inches in greatest dimension shall be placed so that no surface of said material is within three feet horizontally of any planned piling, structure, pole or sign foundations, and underground conduit. No additional compensation will be allowed for the excavation and installation of any planned facility when the additional work is caused by material in excess of six inches within the embankment area. It may be necessary to reduce the size of the excavated material by crushing or otherwise breaking down the material in order to comply with this requirement.

Embankment material placed at bridge abutments, as specified in Subsection 203-10.03(B)(1), shall have a Plasticity Index of not more than 15 when tested in accordance with AASHTO T 90. Material placed within these limits shall contain no rocks

or other solid material greater than 12 inches in its largest dimension between the subgrade elevation and a depth of seven feet. Embankments deeper than seven feet within these limits shall contain no rocks or other solid material greater than 24 inches in its largest dimension.

Concrete with any dimension greater than two feet shall be removed and wasted or reduced to a maximum of 24 inches before placing in embankment.

Embankment construction shall not take place when the material is frozen or a blanket of snow prevents proper compaction of the embankment material.

(B) Compaction:

(1) Earth:

Each layer of the embankment material shall be compacted by rolling, tamping, or other suitable means to the specified density before the next layer is placed. Effective spreading equipment shall be used on each layer to obtain uniform thickness prior to compacting. As the compaction of each layer progresses, continuous leveling and manipulation of the material shall be required to assure uniform density. The moisture content of the material shall be adjusted, if necessary, to obtain the required density. As far as practicable, construction equipment shall be continuously routed uniformly over the entire surface of each layer.

Where embankments five feet or less in height are to be constructed, the top six inches of the ground on which the embankment material is to be placed shall be compacted to a density of not less than 95 percent of the maximum density.

When embankments are to be constructed at bridge abutments, each layer of embankment material placed beneath the approach slab, anchor slab if specified, and an additional 50 feet beyond the limits of these slabs, shall be compacted to a density of not less than 100 percent of the maximum density, including the material specified in Subsection 203-10.02(C). Density requirements will not apply to rocky material placed within these limits, when, in the opinion of the Engineer, the specified Arizona Test Methods for density are not appropriate.

Each layer of roadbed embankment shall be compacted to a density of not less than 95 percent of the maximum density, except that when asphaltic concrete is to be placed directly on subgrade, the top six inches of the embankment shall be compacted to a density of not less than 100 percent of the maximum density. Embankment material placed in dikes shall be compacted to a density of not less than 95 percent of the maximum density.

All density determinations will be made in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer.

(2) Rock:

Density requirements will not apply to portions of embankments constructed of materials that cannot be tested by approved methods.

Rocky materials shall be placed, spread and leveled in 24 inches thick layers, when possible, over the full width of the embankment, with sufficient earth or other fine material so deposited to fill the interstices to produce a dense compact embankment. The average dimension of the largest rock shall not exceed 24 inches. Vibratory compactors, grid, paddle-foot, or vibratory rollers or other compacting equipment approved by the Engineer shall be used for fills constructed of materials which are predominately rock.

Rolling may be omitted on any layer, or portion thereof, when, in the judgment of the Engineer, it is physically impractical. In addition to the above rolling, each layer shall be further compacted by routing the hauling equipment uniformly over the entire width of the embankment. Additional compaction of rock embankments may be required at the discretion of the Engineer.

203-10.04 Blank

203-10.05 Basis of Payment:

No measurement for payment will be made for hauling, placing, shaping, applying water to and compacting embankment materials.

SECTION 204 RESHAPING AND GRADING EXISTING IMPROVEMENTS:

204-1 Description:

The work under this section shall consist of reconstructing or restoring existing dikes, berms and median slopes, including furnishing, placing and compacting embankment material, as required, at the locations and in accordance with the details shown on the project plans, and the requirements of these specifications.

204-2 Blank

204-3 Construction Requirements:

Reconstructing or restoring shall be the rebuilding of existing improvements, at or near the same location, to either new lines, grades and cross sections or to their original lines, grades and cross sections as shown on the project plans.

The reconstruction or restoring of dikes, berms and median slopes shall be accomplished in accordance with the same requirements as for new work of equivalent type and character and conform to the applicable requirements of Section 203.

204-4 Method of Measurement:

Reshaping and grading existing improvements will be measured on a lump sum basis.

204-5 Basis of Payment:

The accepted quantities of reshaping and grading existing improvements will be paid for at the contract lump sum price, which price shall be full compensation for the work as described and specified herein, complete in place.

SECTION 205 GRADING ROADWAY FOR PAVEMENT:

205-1 Description:

The work under this section shall consist of removing pavement, excavating, removal and disposal of excess material, furnishing and placing embankment material, and all grading, shaping and compacting of materials necessary to construct the subgrade to the lines and grades shown in the plans and as depicted by the new pavement section specified and in accordance with the requirements of these specifications.

205-2 Blank

205-3 Construction Requirements:

205-3.01 General:

All existing pavement shall be removed as designated on the project plans. Where new asphaltic concrete is to match existing bituminous surfaces, the edges of the existing bituminous surfaces abutting the new paving shall be either saw cut or wheel cut to a minimum depth of 1-1/2 inches to form a neat true line with straight vertical edges free from irregularities. Should the contractor elect to wheel cut the edges, the cutter wheel shall be adequate for the work, in the opinion of the Engineer, to produce the desired result.

If at the time of removing any portion of the existing roadway, in-place materials from which the new subgrade is to be constructed contain an excess of moisture, so that the required compaction cannot be obtained with reasonable and customary aeration and manipulation, the Engineer will determine the cause of such condition and will determine whether the material shall be further aerated or removed and replaced.

If the cause of such condition is determined to have been unforeseeable and beyond the control of and without fault or negligence of the contractor, such further work shall be done as directed and will be paid for as extra work in accordance with the requirements of Subsection 104.02. Excess moisture caused by irrigation water, storm drainage, weather, breakage of mains, or other similar cause will be considered as within the responsibility of the contractor.

205-3.02 Excavation:

Excavation shall conform with the requirements of Subsection 203-3.

205-3.03 Embankment:

The placement and compaction of embankment shall conform with the requirements of Subsection 203-10.

205-3.04 Compacting and Finishing:

The top six inches of the subgrade shall be compacted to a density not less than 95 percent of the maximum density as determined in accordance with the requirements of the applicable test methods of the ADOT Materials Testing Manual, as directed and approved by the Engineer, except that when asphaltic concrete or Portland cement concrete is to be placed directly on subgrade, the required density shall be 100 percent.

The surface of the subgrade shall be finished to a reasonably smooth and uniform surface and in reasonably close conformity to the lines, grades, dimensions and cross section shown on the project plans or established by the Engineer. The finished surface of the subgrade shall not vary by more than 0.04 feet above or below the grade established by the Engineer except when Portland cement concrete pavement or asphaltic concrete pavement are to be placed directly on the subgrade, the finished surface shall not vary by more than 0.02 feet above or 0.04 feet below the established grade.

205-4 Method of Measurement:

Measurement of grading roadway for pavement will be made by the square yard of the area prepared and subsequently covered with a subbase, base, asphaltic concrete or Portland cement concrete; however, when raised median islands are constructed, the area occupied by these islands will be included in the area measured for payment. Where the new pavement is not bounded by curb and gutter and additional shoulder work is necessary to construct the typical section shown in the project plans, such work shall be considered as incidental and the cost will be considered as included in the cost of the contract bid item Grading Roadway for Pavement.

205-5 Basis of Payment:

The accepted quantities of grading roadway for pavement, measured as provided above, will be paid for at the contract unit price per square yard for the work complete as specified herein and as shown on the project plans.

SECTION 206 FURNISH WATER SUPPLY:

206-1 Description:

The work under this section shall consist of either developing or obtaining an adequate water supply and furnishing all water required for the work.

206-2 Blank

206-3 Construction Requirements:

Material may be watered either at the source or on the roadway, at the option of the contractor.

If the contractor elects to apply water to materials at the source, and these materials will subsequently be measured and paid for on the basis of weight, the contractor shall give the Engineer ample notice of its intentions. Prior to the application of water, the contractor shall furnish such equipment and labor as may be necessary to enable the Engineer to obtain samples for determining the in-place moisture in the materials. The difference in weight between the average in-place moisture content of the material prior to pre-wetting and the average moisture content of the material at the time of weighing will be deducted from the total weight of the material.

206-4 Method of Measurement:

The work will be measured as a single complete lump sum item.

206-5 Basis of Payment:

Payment for this work will be made at the contract lump sum price.

No adjustment of compensation to the contract lump sum price for Furnish Water Supply will be made for any increase or decrease in the quantity of water required, regardless of the reason for such increase or decrease.

The cost of providing a water distribution system; the cost of delivering the water; and the cost of applying the water to aid the compaction of the materials will not be paid for directly but will be considered as included in the prices paid for the various contract items requiring water.

When the bidding schedule does not contain a contract pay item for furnish water supply, full compensation for either developing or obtaining an adequate water supply and furnishing all water required for the work shall be considered as included in the prices paid for the various contract items of work requiring the use of water.

SECTION 207 DUST PALLIATIVE:

207-1 Description:

The work under this section shall consist of applying all water, paid for at the pre-determined contract unit price established in the bidding schedule, required for the control of dust as considered necessary for the safety and convenience of the traveling public, for the reduction of the dust nuisance to adjacent property, for the allaying of dust in crusher and pit operations and on roads used to haul materials, and for other purposes as directed by the Engineer.

The work shall also include developing or obtaining a water supply and furnishing all water necessary for the control of dust, unless a separate item for Furnish Water Supply is included in the bidding schedule. If an item is established, the costs for developing or

obtaining a water supply and furnishing all water necessary for dust palliative shall be included in the item for Furnish Water Supply.

207-2 Blank

207-3 Construction Requirements:

The use of pressure pumps and spray bars on all sprinkling equipment used for the application of dust palliative will be required. The use of gravity flow spray bars and splash plates will not be permitted.

When it is required that chemical additives be mixed with the water for the suppression of dust, the cost of such chemical additives and the cost of adding them to the water will be paid for as extra work in accordance with the provisions of Subsection 104.02.

Unless otherwise permitted by the Engineer, at least one mobile unit shall be available for applying water on the project.

Water for use in compaction or for pre-wetting shall be applied in accordance with Section 203, and these Special Provisions.

Water applied for dust control shall be as approved or directed by the Engineer.

Water conservation by using alternative dust control treatments is encouraged. The contractor may propose alternative dust suppressants for subgrades, embankments and other areas within the project, for haul roads, or for controlling dust at equipment yard sites. When the use of chemical dust suppressants is proposed in lieu of water, the contractor's submittal shall be in accordance with the value engineering process as specified in Subsection 104.06.

207-4 Method of Measurement:

The work will be measured by the unit of 1,000 U.S. gallons of water and the quantity to be allowed for payment will be the amount of water applied as directed by the Engineer. Measurement will be made in tanks or tank trucks of predetermined capacity, by means of certified, sealed meters or by other means approved by the Engineer.

207-5 Basis of Payment:

The work, measured as provided above, will be paid for at the contract unit price specified in the bidding schedule.

No separate payment will be made for developing or obtaining a water supply and furnishing all water necessary for the control of dust, the cost being considered as included in other contract items, unless a separate item for Furnish Water Supply is included in the bidding schedule. If an item is established, the costs for developing or obtaining a water supply and furnishing all water necessary for dust palliative shall be included in the item for Furnish Water Supply.

Payment for chemical dust suppressants, when approved, shall be in accordance with Subsection 104.06. Other alternative dust suppressants, when approved by the Engineer, will be paid for in accordance with Subsection 109.04.

No measurement will be made under this section of water used in compacting of materials, used in wet collectors in conjunction with hot plants, used for dust control at commercial sources or for haul roads from commercial sources, as defined in Subsection 1001-2 of these specifications, or for the sole convenience of the contractor, or for any other purpose not specifically authorized.

SECTION 208 SEPARATION GEOTEXTILE FABRIC:

208-1 Description:

The work under this section shall consist of furnishing and placing a permeable separation geotextile fabric. The fabric shall be placed in accordance with the details shown on the project Plans and the requirements of these specifications.

208-2 Materials:

208-2.01 Geotextile Fabric:

The separation geotextile fabric shall be supplied in accordance with and conform to the material requirements of Subsections 1014-1 and 1014-4. Special attention shall be given to the required survivability of the fabric material which will be as called out in the Special Provisions or as shown on the plans.

208-2.02 Fabric Packaging, Handling, and Storage:

The identification, packaging, handling, and storage of the geotextile fabric shall be in accordance with ASTM D 4873. Fabric rolls shall be furnished with suitable wrapping for protection against moisture and extended ultraviolet exposure prior to placement. Each roll shall be labeled or tagged to provide product identification sufficient to determine the product type, manufacturer, quantity, lot number, roll number, date of manufacture, shipping date, and the project number and name to which it is assigned. Rolls will be stored on the site or at another identified storage location in a manner which protects them from the elements. If stored outdoors, they shall be elevated and protected with a waterproof, light colored, opaque cover. At no time, shall the fabric be exposed to sunlight for a period exceeding 14 days.

208-3 Construction Requirements:

208-3.01 Weather Limitations:

Separation geotextile fabric shall not be placed when weather conditions, in the opinion of the Engineer, are not suitable to allow placement or installation. This will normally be at

times of wet or snowy conditions, heavy rainfall, extreme cold or frost conditions, or extreme heat.

208-3.02 Equipment:

Mechanical or manual laydown equipment shall be capable of handling full rolls of fabric, and laying the fabric smoothly, without wrinkles or folds. The equipment shall be in accordance with the fabric manufacturer's recommendations or as approved by the Engineer.

208-3.03 Surface Preparation:

The surface upon which the separation fabric will be placed shall be compacted and finished according to the requirements of these specifications.

208-3.04 Fabric Placement:

The separation geotextile fabric shall be unrolled on the finished surface and laid smooth without wrinkles. The placement of fabric by dragging across the finished surface will not be allowed. The geotextile fabric shall be overlapped a minimum 24 inches for longitudinal and transverse joints. The center of a longitudinal overlapped joint shall be located in the same manner as a longitudinal pavement joint according to Subsection 406-6. Transverse overlaps shall be in the direction of aggregate placement.

208-3.05 Placement and Compaction of Aggregate:

Aggregate materials shall be placed by back dumping the aggregate in a manner which does not damage the fabric and then spreading the aggregate material onto the geotextile fabric in a constant forward direction. Traffic or construction equipment shall not be permitted directly on the geotextile unless approved by the Engineer for emergency purposes. Pins or piles of aggregate can be used to hold the geotextile in place while being covered.

Overstressing the subgrade soil shall be avoided by utilizing equipment in spreading and dumping that exerts only moderate pressures on the soil. If ruts of two inches or greater occur in the aggregate, the contractor shall use lighter equipment which transmits less ground pressure. Any ruts which develop during spreading or compacting aggregate shall be filled with additional aggregate rather than bladed from adjacent areas so that the final design aggregate thickness is maintained. Construction equipment shall not be allowed to turn or stop suddenly on the aggregate placed over the geotextile fabric.

Aggregate base shall be compacted as specified in Subsection 303-3.02. Aggregate base material shall not be mixed or processed on the separation geotextile fabric. The aggregate base material shall be premixed at the stockpile area or at another location in a manner approved by the Engineer. Aggregate base materials will be sampled for acceptance after premixing and prior to placement on the separation fabric. Contamination and segregation of aggregate base materials prior to or during placement shall be minimized.

Any damage to the fabric occurring during placement of the aggregate must be repaired immediately. The aggregate shall be removed from the damaged area to allow placement of a fabric patch extending three feet on all sides beyond the damaged area, followed by replacement of the aggregate.

208-4 Method of Measurement:

Separation geotextile fabric will be measured by the square yard in-place. Measurement will be to the nearest square yard. No allowance will be made for material in laps.

208-5 Basis of Payment:

The accepted quantity of separation geotextile fabric, measured as provided above, will be paid for at the contract unit price per square yard, which price shall be full compensation for furnishing all labor, materials, and equipment, and performing all operations in connection with placing the separation geotextile fabric as shown on the project plans. No payment will be made for separation geotextile fabric rejected, or patches which are necessary, due to either contamination or damage due to either the fault or negligence of the contractor.